IA reminder, Due Oct 2 11:58
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key: Physics

Simple Harmonic Motion, SHM

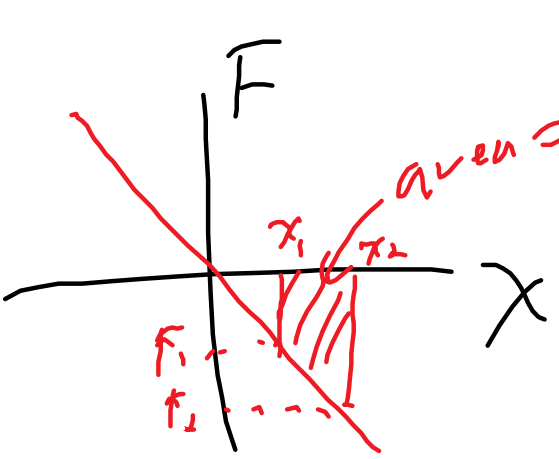
examples: Mass on a spring oscillating (moving up and down or back and forth) or pendulum - bob on a string

definition:

Motion where the restoring force, F, is proportional to the displacement from equilibrium, x.
IB notation: $F_o = F_{max}$ $x_o = x_{max} = A$ - amplitude

You need to know Hooke's Law:
$F=-kx$ k is the elastic constant and x is the displacement or the distance the spring is stretched or compressed

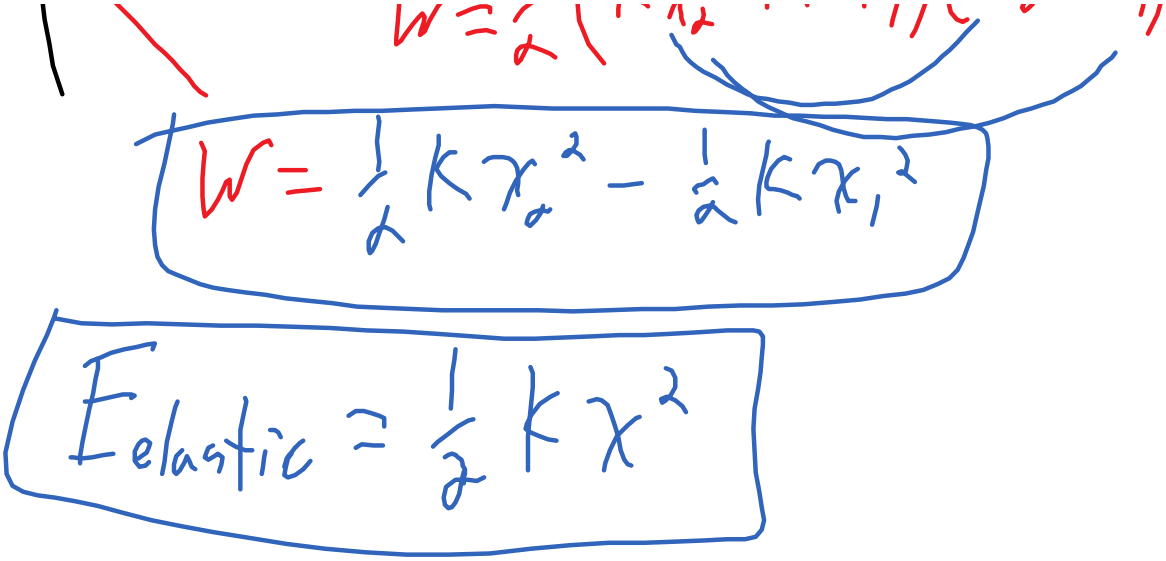
elastic energy, $E_{elastic}$ =




$area = W = \Delta E_{energy}$

$W = \frac{1}{2}(F_2 + F_1)(x_2 - x_1)$

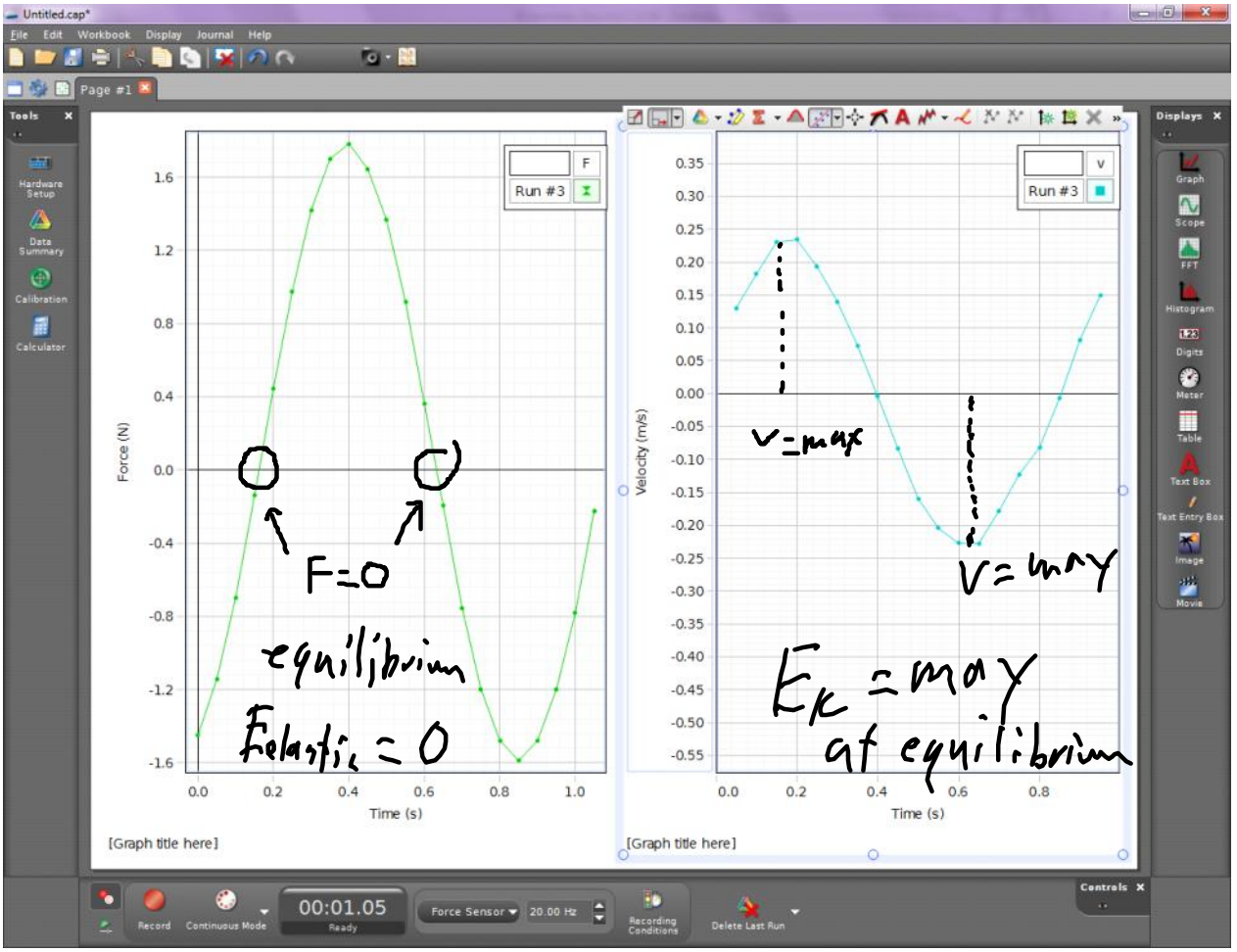
$W = \frac{1}{2}(kx_2 + kx_1)(x_2 - x_1)$




In an oscillating mass, the elastic energy changes into kinetic energy.

eg. A spring is 20.0 cm long. When I hang a 500 g mass on it, it extends to 39.0 cm. I pull the mass down 2.0 cm and let go. Determine:

a) elastic constant
b) elastic energy relative to the equilibrium position when you pull it down 2.0cm.
c) kinetic energy when it is in the equilibrium position
d) speed at equilibrium position




Not in SL curriculum but common question

$$T = 2\pi\sqrt{\frac{m}{k}} \qquad T = 2\pi\sqrt{\frac{L}{g}}$$

mass on spring

Pendulum length L

The period is not dependent on the amplitude.

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